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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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11/27/2001

O-Ok Park

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07/30/2003

KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

EXAMINER

THOMPSON, CAMIE S

ART UNIT

PAPER NUMBER

1774

DATE MAILED: 07/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/995,816

Applicant(s)

PARK ET AL.

Examiner

Camie S Thompson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. ____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2&5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Korea on March 30, 2003. It is noted, however, that applicant has not filed a certified copy of the Korean application as required by 35 U.S.C. 119(b).

Specification

2. The abstract of the disclosure is objected to because there are three sets of parenthesis that are not filled in for the description of Figure 2 in paragraph [0026]. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

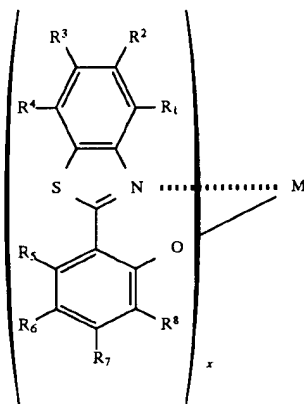
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-5, 8-9, 12 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Shi et al., U.S. Patent Number 5,817,431.

Shi discloses an organic electroluminescent display device that includes a plurality of layers disposed between opposing electrodes and the electron-injecting layer is characterized by the following formula

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where M is a metal ion as per instant claims 1, 2 and 12 (see abstract). The reference also discloses a substrate such as glass and deposited atop of the substrate is a semitransparent electrode such as indium-tin oxide as per instant claims 2-4 (see column 3, lines 30-52). The hole injection and hole transporting layers are deposited atop of the semitransparent electrode in the reference. Additionally, the organic emissive layer is deposited atop the hole injection/transporting layers and the electron injecting/transporting layers are deposited atop of the emissive layer. The metal electrode is deposited atop of the electron injecting/transporting layers (see Figure 1). Column 4, lines 9-36 discloses an emissive monomeric material such as an alumina quinone used in the organic emitting layer as per instant claims 5 and 8. The metal for the electrode is selected from aluminum, gold, indium, copper and silver as per instant claim 9 (see column 4, lines 59-68).

5. Claims 1-6, 8-9 and 18 rejected under 35 U.S.C. 102(b) as being anticipated by WO 97/40648.

The reference discloses an organic electroluminescent device wherein the organic layer comprises mobile and immobile ions in a manner that the polarity of all mobile ions is the same. Also, the reference discloses that the "charge transport" is to be understood to mean the transport

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of electrons and holes necessary for electroluminescence. The reference also discloses that a multilayer EL structure is possible (see page 3, lines 7-26). The reference discloses suitable anions and cations such as I^- and Li^+ (see page 4, line 32-page 5, line 4). Additionally, the reference discloses combining the ionogenic compound with known charge-transporting and EL compounds as per the instant claims (see column 3, line 63-column 4, line 25). Exemplary embodiment 8 of the reference describes the layered construction of instant claim 18. Page 4, lines 1-12 disclose using a gold cathode and an indium tin oxide anode on a glass substrate as per instant claims 3-4 and 9. It is also disclosed on page 5, lines 5-17 that conjugated polymers and coumarines are used in the ionic layer as per instant claims 5-6 and 8-9.

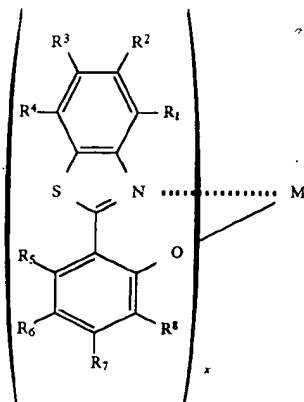
Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shi et al., U.S. Patent Number 5,817,431 in view of Pei et al., U.S. Patent Number 5,682,043.

Shi discloses an organic electroluminescent display device that includes a plurality of layers disposed between opposing electrodes and the electron-injecting layer is characterized by the following formula



where M is a metal ion as per instant claims 1 and 2 (see abstract). The reference also discloses a substrate such as glass and deposited atop of the substrate is a semitransparent electrode such as indium-tin oxide as per instant claims 2-4 (see column 3, lines 30-52). The hole injection and hole transporting layers are deposited atop of the semitransparent electrode in the reference. Additionally, the organic emissive layer is deposited atop the hole injection/transporting layers and the electron injecting/transporting layers are deposited atop of the emissive layer. The metal electrode is deposited atop of the electron injecting/transporting layers (see Figure 1). Figure 1 of the Shi reference discloses the layered structure of the EL device. Column 4, lines 9-36 discloses an emissive monomeric material such as an alumina quinone used in the organic emitting layer as per instant claims 5 and 8. Shi does not disclose using a conjugated polymer or a non-conjugated polymer in the emissive layer as per instant claims 6 and 7. Pei discloses an electrochemical light-emitting device wherein a composite material is in contact with two electrodes. The composite material is admixture of ionic species and an immobile semiconductor (see abstract). The reference discloses suitable choices for the semiconductor as poly(p-phenylene vinylene, anthracene and arylene moieties as per instant claims 6-7. The polymers of the semiconductors are capable of having a doping profile that can be dynamically

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changed in a controlled fashion through reversible electrochemical oxidation and reduction.

Therefore, it would have been obvious to one of ordinary skill in the art to use the suitable polymers disclosed in the Pei reference in order for the semiconductor to support both positive and negative carriers (see abstract of Pei).

8. Claims 1-6, 8-10 and 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schoo et al., U.S. Patent Number 6,326,091.

Schoo discloses an organic electroluminescent device wherein the organic layer comprises mobile and immobile ions in a manner that the polarity of all mobile ions is the same. Schoo also discloses that the "charge transport" is to be understood to mean the transport of electrons and holes necessary for electroluminescence. The reference also discloses that a multilayer EL structure is possible (see column 2, lines 40-68). The reference discloses suitable anions and cations such as I^- and Li^+ (see column 3, line 63-column 4, line 6). Schoo also discloses combining the ionogenic compound with known charge-transporting and EL compounds as per the instant claims (see column 3, line 63-column 4, line 25). Exemplary embodiment 8 in the reference discloses the layered construction in claim 18. Although Schoo does not disclose specific sandwich constructions as per instant claims 14-17 and 19, it would have been obvious to make simple modifications in a multilayer EL in order to achieve luminescent efficiency.

9. Claims 10-11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schoo et al., U.S. Patent 6,326,091 as applied to claim 2 above, and further in view of Pei et al., U.S. Patent Number 5,682,043.

Schoo does disclose the use of polyethylene oxide as a desirable ion-conducting polymer, but does not disclose the polymers of instant claims 11 and 13. However, Pei does disclose

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electrochemical light-emitting device wherein a composite material is in contact with two electrodes. The composite material is an admixture of ionic species and an immobile semiconductor (see abstract). Additionally, Pei discloses that polyethylene oxide and poly(propylene oxide) and mixtures thereof used as ionic species (see column 8, line 54-column 9, line 4). The combination of the ionic polymer of the Pei reference with Schoo reference would increase the service life of the EL device. Therefore, it would have been obvious to one of ordinary skill in the art to use the polymers of formulas I-IV of the instant application in order to achieve greater luminescence and longer life from the device.

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Lee reference teaches an organic luminescent device that employs a polymer made of an ionomer containing metal ions as a charge transport layer.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Camie S. Thompson whose telephone number is (703) 305-4488. The examiner can normally be reached on Monday through Friday from 7:30 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly, can be reached at (703) 308-0449. The fax phone numbers for the Group are (703) 872-9310 {before finals} and (703) 872-9311 {after finals}.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.



MARIE YAMNITZKY
PRIMARY EXAMINER

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